

regarding topography, climate, and soil, and the typical zonation of the vegetation is outlined. These lakes are within the limits of the *Picea Engelmanni* forest, and the succession from the water's edge includes moor, heath, and meadow associations. Different expressions of these types are to be seen about the various lakes, the moor, with its variations of moss moor, sedge moor, rush moor, willow moor, and meadow moor, usually occupying a large proportion of the area. Perhaps the most interesting of the communities is the heath, in which *Gaultheria humifusa*, *Vaccinium caespitosum*, and *Kalmia microphylla* are conspicuous. Any one of these small undershrubs or a combination of all three may dominate a comparatively narrow belt of vegetation midway between the lake and the forest. The several aspects of the associations are noted, the meadows affording the most brilliant and varied display. Maps, diagrams, quadrats, and lists of species make the report graphic and exact.—GEO. D. FULLER.

Accessory foods for plants.—BOTTOMLEY³⁵ has found several chlorophyll bearing water plants unable to develop normally in nutrient salt solutions not bearing accessory organic foods. The plants worked on were as follows, naming them in descending order of their dependence upon the organic material: *Lemna major* and *L. minor*, *Salvinia natans*, *Azolla filiculoides*, and *Limnobium stoloniferum*.

"The effective organic substances were found to be present in an autoclaved growth of *Azotobacter chroococcum*, crude nucleic acid derivatives from raw peat, and a water extract of bacterized peat. . . . In no case did the organic substance supplied exceed 184 parts per million, while the concentration of inorganic salts in the culture solution totaled 5500 parts per million."

The author thinks that these plants in nature secure their necessary organic materials from the waters in which they grow. From the work of BOTTOMLEY and of several other investigators who have recently published their results, it appears that accessory foods may have considerable significance in plant development, as they have very great significance in animal nutrition and growth.—WM. CROCKER.

Rate of photosynthesis in the field—MCLEAN³⁶ of the Philippines has worked up a simple method of measuring the amount of carbon dioxide absorbed by leaves in the open. There is certainly great need of such methods for determining photosynthetic rates as well as the rates of other plant processes occurring in the field. Recently a farmer who had fertilized heavily with rock phosphate and limestone asked why his corn with about the same foliage stores more than twice as much starch in the ears as his neighbor's corn for

³⁵ BOTTOMLEY, W. B., The effect of organic matter on the growth of various water plants in culture solutions. *Ann. Botany* 34:353-365. 1920.

³⁶ MCLEAN, F. T., Field studies of the carbon dioxide absorption of coconut leaves. *Ann. Botany* 34:367-389. 1920.